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ABSTRACT

This study sought to examine the group dynamics of children working and learning collaboratively on a computer-based instructional writing task. Standard 3 and 4 children at two urban primary schools in the Dunedin area of New Zealand were assigned the task of producing illustrated interactive stories using the "Twist-a-plot" program. Pupils worked in groups of about four members where group membership was determined in various ways (the "independent variable"). Allocation to group was child-initiated, teacher-initiated, or a mixture of the two, with social attractiveness and scholastic abilities taken into consideration. At the end of each phase, all groups and individuals were given a standard detailed interview designed to examine aspects of group dynamics, in particular, leadership roles, participation in the task, and attitude toward the group and the task. The major findings were: (1) virtually all groups completed the word processing writing task, irrespective of the method of allocation to group; (2) children were happy to work in mixed-sex groups but reluctant to publicly choose to work with pupils of the opposite sex; (3) both boys and girls tended to believe that "boys are good at pictures and story, and girls are good at typing"; (4) in groups of mixed scholastic ability slower pupils are likely to be left behind; and (5) children do not have much awareness of group processes. Appendices include the student interview schedules, a rationale and analysis of the term two and term three interviews, and a summary of responses to the term four interviews. (5 references) (Author/DB)

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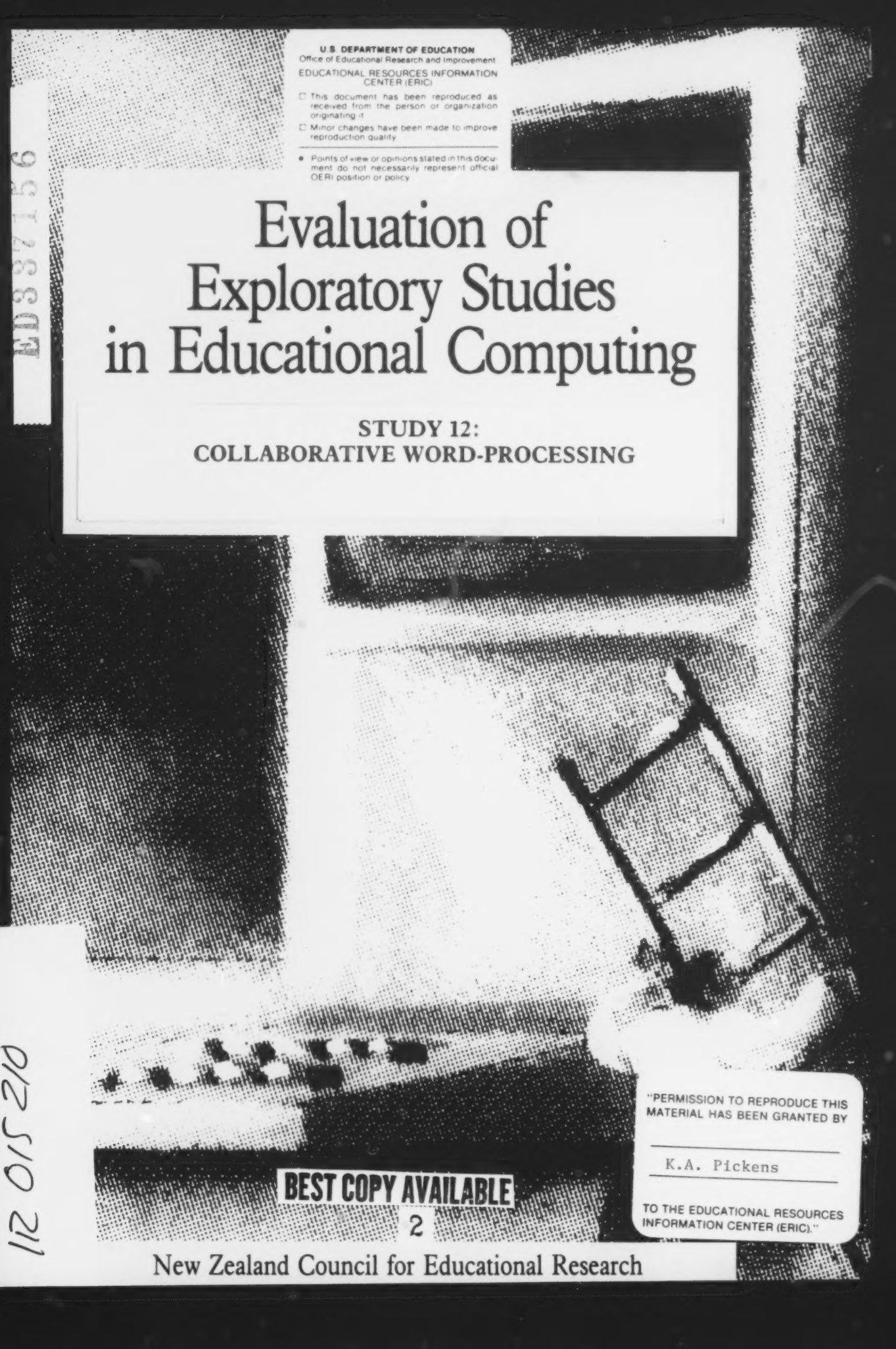
Evaluation of Exploratory Studies in Educational Computing

STUDY 12: COLLABORATIVE WORD-PROCESSING



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New Zealand Council for Educational Research

Evaluation of
Exploratory Studies in Educational Computing

STUDY 12:
COLLABORATIVE WORD-PROCESSING

FINAL REPORT – 1989

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ABSTRACT

This study sought to examine the group dynamics of children working collaboratively on a computer-based writing task. Standard 3 and 4 children at two urban primary schools were assigned the task of producing illustrated interactive stories, using the *Twist-a-plot* program. Pupils worked in groups of about four members, where group membership was determined in various ways (the 'independent variable'). Allocation to group was child-initiated, teacher-initiated, or a mixture of the two, with social attractiveness and scholastic abilities taken into consideration. At the end of each phase, all groups and individuals were given a standard, detailed interview. The interview was designed to examine various aspects of group dynamics, in particular, leadership roles, participation in the task, and attitude towards the group and task.

The major findings were:

1. Virtually all groups completed the task to the satisfaction of the teacher, irrespective of method of allocation to group.

2. Although children express mixed-sex groups as being the ideal, and are quite happy to be allocated to mixed-sex groups, they are unwilling to freely and publically choose to work with pupils of the opposite sex.

3. Both boys and girls tended to believe that 'boys are good at pictures and story, and girls are good at typing'.

4. There is some danger that in groups of mixed scholastic ability, slower pupils are likely to be left behind by the more academically able.

5. Children do not have much awareness of group processes, in particular, they would typically deny that their group had a leader, although there were few cases where the interview failed to reveal a group leader.

TABLE OF CONTENTS

Tables		vi
Preface		vii
1 Introduction		1
2 Aim of Evaluation		3
3 General Procedure		3
4 Results		9
5 Conclusions		18
References		20
Appendices		
Appendix A	The student interview schedules	21
Appendix B	Rationale and analysis of interviews	28
Appendix C	Summary of responses to the Term 4 interview	33

TABLES

1	Sex, age and class-level of participating children	4
2	Socio-economic profile of schools	5
3	Leadership characteristics: origin of story idea	11
4	Attitude to future group composition	15
5	Strength of positive response to selected Term 2 questions	17

PREFACE

The Exploratory Studies in Educational Computing (ESEC) were set up at the request of, and funded by, the Minister of Education, following a new policy provision introduced in 1985. The purpose of the studies was to provide a basis for future policy developments in educational computing.

Initial proposals were sought in an advertisement in the *Education Gazette* of 14 June, 1985, and some 200 separate proposals from more than 100 schools were received. A broadly representative conference met at the Stella Maris Retreat Centre, Wellington, between 2-6 September, 1985 to consider the applications, and eventually 15 distinct studies for major funding were chosen. Subsequently two of these were subdivided, making 19 separate studies in all.

The Computers in Education Development Unit (CEDU), within the Department of Education, was responsible for the technical management and funding of the projects, and with the exception of one study, the New Zealand Council for Educational Research has been responsible for their evaluation. (One is being evaluated at the University of Auckland.) Each study was co-ordinated and conducted by a committee consisting of the teachers involved (who were often, though not always, the originators of the study), one member from the CEDU, at least one member from the NZCER, and often others from the inspectorate, teachers colleges or regional resource centres.

Many of the proposals had requested specific computer equipment and software, and this was ordered and shipped to schools by the beginning of 1986. Classroom computer work commenced at various times during 1986, and proceeded through 1987. Various research materials were prepared for use as required by all the studies, including pre- and post-questionnaires for students and teachers, and logs and diaries to record day-to-day impressions. In addition, study-specific instruments were prepared where necessary. One of the studies was at the preschool level, and four studies dealt with children with special needs.

All of the remainder were located in primary schools, but some involved secondary school children as well.

The projects are distinctive in the way in which they have been initiated by classroom teachers, rather than by Departmental policy-makers or educational reseachers. The level of commitment from all the teachers involved in the projects has consequently been very high. They responded positively to the opportunity to participate, and contributed many hours of extra work to the evaluative aspects of the studies.

This study owes special thanks to Mr. Jim Fergusson and Ms. H. Bradbury of the Department of Education's Computers in Education Development Unit; Mr. Nigel Wilson of Dunedin Teachers' College; Mr. Martin Brash of Wakari School; Mr. John Stratton of Arthur St. School; Dr. Alison Gilmore of the New Zealand Council for Educational Research; and to the teachers at the participating schools.

Daniel Ashworth
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March 1989

1 INTRODUCTION

This study focuses on children working cooperatively at a computer. There are a number of factors which make this an important area of study. Firstly, there are ideological reasons why cooperative behaviours in the classroom are of intrinsic interest. Most people would probably agree that 'cooperation' is a 'good thing', and to be encouraged. Many claims are made about cooperative learning and its effects. For example, Johnson and Johnson (1986) assert that, compared with other forms of learning:

> ... cooperation promotes greater oral discussion of the material being learned; higher achievement; more frequent use of higher-level reasoning strategies; longer retention of the material being learned; higher achievement motivation; more positive attitudes about school, subject areas, instructional experience, and teachers; more positive attitudes towards classmates, regardless of differences in ability, ethnic background, and sex; greater self esteem, psychological health, and collaborative skills.

Though a promising concept, the practice contains many pitfalls and the results are not easy to quantify. Experience has shown that just putting children into groups does not automatically produce immediate positive results. Group working is a complex process and varies according to the personalities of the individuals in the groups and the nature of the task. Murray (1988) points out that the group members have to adjust to one another and this may not happen quickly. 'Above all we need to give time for a group to emerge - i.e. to develop through the stages of negotiation, establish norms and values - most of all to give a chance for it to work.'

However, apart from possible social objectives, there are often purely practical reasons why it may be desirable to have children work together in groups; a major reason why cooperative behaviour is important in the classroom use of a wordprocessor, is that limited resources currently mean that sharing is a necessity - there are not enough computers to allow each child to have long periods of solo access. Faced with a typical situation of around 30 pupils and two computers, the teacher has to schedule computer work so that it is concurrent with other classroom activities, and, if possible, so that more than one child works with the computer at a time. This raises the question, for a given type of activity, of how best to select a group of

children to work together. This study also examines some of the effects of different methods of selecting children for a cooperative group writing task.

2 AIM OF EVALUATION

In this, the twelfth of the Exploratory Studies in Educational Computing (ESEC), methods of selecting children to work together on a cooperative writing project were examined. Pupil collaboration in the design, writing and implementation of computer-presented branching stories, within a writing programme are compared under the following conditions:

1. mixed versus similar-ability groups,
2. teacher-structured versus 'free choice' groups,
3. groups of differing size.

3 GENERAL PROCEDURE

Sample

Two schools in the Dunedin area participated in the study, each providing two Standard 3 and 4 (combined) classes. Table 1 shows the sex, age and class-level composition of the participating children over the two years of the study. Table 2 shows the socio-economic distribution of (parents of participating children at) the schools in Year 1. The scale is a categorisation of parent's occupation according to Elley and Irving (the 'Elley-Irving' scale for male occupational categories - top half of table, or the 'Irving-Elley' scale for female occupational categories - bottom half of table). The 'NA' category includes children for whom the parent was deceased or absent from home, category 'H' includes housewife, househusband, homemaker etc. where specifically stated, and category 'NW' includes unemployed and retired. Otherwise the scale is an occupational scale from 'high pay and social status' (category '1') through 'low pay and social status' (category '6'). The bottom row of the table shows the SES distribution for all of the other primary schools in the ESEC studies for the purpose of comparison. The non-response category has been omitted. School A had about 200 pupils and seven teachers over the two years. The catchment of this school, as Table 2

suggests, was dominated by professional people. School B, situated in an ex-state housing area, now mainly populated by white-collar workers who had bought their houses, had about 300 pupils and 13 teachers.

In 1986, the first year of the study, children at School A had generally had previous school experience with computers, while children at School B had not.

Table 1

Sex, age and class-level of participating children

Class	Level	Sex	Mean age (Year1, 2)	N (Year1, 2)
A2	S3	male	9.4, 9.0	7, 2
		female	9.0, 8.8	7, 6
		all	9.2, 8.9	14, 8
	S4	male	10.0, 10.4	7, 7
		female	10.0, 10.0	9, 7
		all	10.0, 10.2	16, 14
A1	S3	male	9.0, 9.0	10, 2
		female	9.5, 9.0	6, 6
		all	9.2, 9.0	16, 8
	S4	male	10.0, 10.0	8, 10
		female	10.3, 10.5	8, 6
		all	10.1, 10.2	16, 16
B2	S3	male	9.0, 9.0	3, 6
		female	9.0	0, 8
		all	9.0, 9.0	3, 14
	S4	male	10.2, 10.0	12, 4
		female	10.7, 10.0	13, 8
		all	10.4, 10.0	25, 12
B1	S3	male	9.3, 8.8	7, 5
		female	8.6	0, 8
		all	9.3, 8.7	7, 13
	S4	male	10.1, 10.0	11, 10
		female	10.1, 9.8	16, 5
		all	10.1, 9.9	27, 15

Note: numbers of pupils may differ slightly from table to table as on any given day there would usually be a few pupils absent.

Table 2

Socio-economic profile of schools

School		SES level (Father's occupation)								
		NA	NW	H	1	2	3	4	5	6
A	N	5			15	9	16	9	4	2
	%	*8*			*25*	*15*	*27*	*15*	*7*	*3*
B	N	7		1	9	9	11	15	1	5
	%	*12*		*2*	*16*	*16*	*19*	*26*	*2*	*9*
All other primary										
	N	31	9	1	79	55	73	243	72	52
	%	*5*	*1*		*13*	*9*	*12*	*40*	*12*	*8*

		SES level (Mother's occupation)								
		NA	NW	H	1	2	3	4	5	6
A	N	4		14	3	11	10	15	5	1
	%	*6*		*22*	*5*	*17*	*16*	*24*	*8*	*2*
B	N	3		21	2	5	6	7	10	4
	%	*5*		*36*	*3*	*9*	*10*	*12*	*17*	*7*
All other primary										
	N			306	17	58	92	174	45	61
	%			*47*	*3*	*9*	*14*	*11*	*7*	*9*

Software and Hardware

For each of the four classrooms, two Apple IIe's with colour monitors and one printer were made available for the duration of the study. Both schools also had Apple IIe's of their own, and these were occasionally used to supplement the 'study' machines. The software used for the interactive fiction was the *Twist-A-Plot* program, and the associated graphics program *Sorcerer's Apprentice* produced by Otako Software of Dunedin. The main word-processing program used was *Bank Street Writer* from the Bank Street College of Education. In the second year, the locally produced word-processing program *Fulltext* was also used.

Sorcerers Apprentice is a picture editor for the Apple II which provides tools for drawing and modifying detailed colour pictures. *Twist-a-Plot* is an interactive-fiction manager, which enables the writer to link pages of text and pictures in linear or branching sequences which can later be traced by a reader who makes a choice or answers a question at the end of each page. The answer determines which branch is followed.

Procedure

The study took place in four classes (A1, A2, B1 and B2), over four terms. Term 1 was a general introductory period for both children and teachers, although all teachers and most of the children (particularly at school A) had had some previous experience with use of computers. The introductory process included working through the *Bank Street Writer* tutorial, and production of a whole-class *Twist-A-Plot* story, from design of a flow-chart, through allocation of pages to writers, production of illustrations, and finally, to production of a 'running' story. By this stage all children, in theory, knew how to use *Bank Street Writer* to produce the written pages, *Sorcerer's Apprentice* to produce the illustrations, and the *Twist-A-Plot* program to link the pieces together so that the story 'ran' (i.e., could be read). They had also been told of the importance of planning the scheme of the story first on paper, and shown how to make a flow-chart as the preferred means of achieving this plan. In Terms 2, 3 and 4 groups of children went on to design and produce their own stories, with only the 'normal' amount of teacher intervention, monitoring and guidance.

In Term 2 mixed-ability and similar-ability groups were formed. Groups were teacher-chosen on ability as measured by a combined PAT score ('Listening' and 'Reading Comprehension'), and were constructed so as to have, where possible, four members (there were inevitably some with three or five), an equal number of boys and girls, or at least to avoid a many-to-one ratio on the basis of sex. Despite these considerations there were some all-boy or all-girl groups. 'Mixed-ability' groups (for classes A1 and B1) were created by assigning one child from each PAT-quartile. 'Similar-ability' groups (for classes A2 and B2) were constructed by chosing adjacently-ranked children (in so far as the other selection criteria permitted).

The original intention was that children would be timetabled for half-an-hour daily to work on their stories; however this was not strictly adhered to, especially as time passed, and the children generally became

quicker or, in a few cases, bored. Some groups produced more than one story, others finished early.

In Term 3, children were allowed to organise the grouping for themselves, without regard to size, ability, or any other constraint. As before, groups then worked on composing *Twist-A-Plot* stories.

Term 4 was the first term of the second year (1987). There was no change of teaching personnel; however each class lost its Standard 4 cohort and gained a new intake of Standard 3's. At School A, this amounted to about half of the class in each case, but in School B the number lost was of the order of three-quarters. Nevertheless, in both schools, as a result of greater teacher familiarity with the process, and greater general pupil familiarity with computers (or at least word-processing), the introductory period was able to be greatly reduced and was completed within a couple of weeks. The major thrust of Term 4 was again to examine methods of ability grouping. This time a different measure of scholastic ability was used, as well as a social ability rating.

Throughout the study there had been much discussion as to what was meant by 'ability'. Initially, and in the absence of any alternatives, teachers had agreed to use a combination of PAT scores, but they remained concerned that this ignored some facets of what they intuitively understood by 'ability': particularly the social factors. Term 4, therefore, was essentially a replication of Term 1, but using two alternative measures of 'ability'; one largely scholastic, and the other largely social. At School B each pupil's 'P and A' record from the previous year was used, and at School A a sociogram of childrens' preferences for whom they judged to be good people to work with, mediated by the teacher, was used to construct a popularity rating. Teachers then used these scores to assign pupils to similar ability groupings.

Data

Three major categories of data were collected:

1. verbal and written reports from teachers,
2. interviews of pupils and teachers, and
3. the stories written by the children.

In terms of assessing the efficacy of the different procedures for forming groups, the third category of data, the work actually produced by the groups, has to be largely ignored. Practically all groups, under all conditions, did

produce a 'working' story, but practical difficulties aside, time did not permit an evaluative analysis of these. Therefore, the success of the groups is largely judged from the interviews and teacher-reports.

It was initially intended that group-dynamics would be measured by means of employing trained observers to monitor the groups as they worked. However scarcity of funds and personnel prohibited this, and observation was replaced by a once-a-term interview of all children individually and in their groups. The two teachers from School A interviewed the children at School B, and the teachers from B interviewed the children at A. Generally observers from NZCER and CEDU were also present. The interviews were recorded on tape, and later analysed at NZCER. The three sets of interview questions are presented herewith as Appendix A, with a more detailed summary of responses in Appendices B and C.

The children were interviewed (by a teacher from the other school) firstly in their group and then individually. While the questions asked of the group were different from those put to the child alone they covered a lot of common ground. These two-part interviews enabled a picture to be built of the group dynamics. Comparing notes afterwards the teachers expressed surprise at the degree of perception obtained by the audio-analyst though they were able to point out factors contributing to some situations which were not able to be discerned from the taped interview.

The first two interview schedules were very similar but the third was produced after the aims and results of the previous two were analysed and the schedule was redrawn with the value of experience. In general little was learnt from the group interview compared with the individual interview, although it was felt that the former was valuable as a discussion and memory prompter for the children. By Term 4, the group interview was reduced dramatically to more of a discussion while the individual interview was adjusted to provide more relevant information through additional and reordered questions.

At the end of Term 4 the teachers were also interviewed, focussing on their impressions and experiences as participants in the study. The interview was of a half-hour duration and covered teaching style, group composition, gender issues, effects of computers on the classroom and children, and experiences as interviewers.

4 RESULTS

Detailed summaries of responses to the interview questions are presented in Appendices B and C. The group interviews were of very limited value to the analysis although the interviewers reported that they could pick up a lot from the body language and general demeanour of the children which of course did not come out on tape. The audio-analyst found it difficult to distinguish voices, and if two or more children were speaking at once the product was incomprehensible.

The results and information are generally anecdotal rather than statistical. Some data are shown (below and in Appendices B and C) but it should be noted that the interviews were conducted by four different interviewers who did not ask the questions in the same way or with the same emphasis and used various levels of prompting to provoke answers. At times in the first two sets of interviews they altered the questions slightly. This problem arose partly out of the inadequacy of some of the questions and partly through the teacher/interviewers not realizing the need for a high degree of consistency when a comparative analysis was to be attempted. After a request for conformity the problem largely disappeared (by the final interviews), although there was still a tendency to suggest answers for the children to assent to, in place of simply asking a question. The interviewers, without exception however, related very well to the children, establishing a very good rapport with them and drawing them into conversations easily. Hence an extensive account of the group dynamics can be made with some confidence.

Division of Labour Within the Group

The most obvious difference to emerge was that between the schools. While in School B there was often an unfair division of labour, this was not a strong possibility in School A as the children were instructed to divide up the pages and the pictures equally. Their response to the 'what did you do' question was often 'I did my own pages'. The School B teachers adopted a more laissez-faire attitude and the groups were able to decide who did what jobs or roles without any teacher intervention. There was, as a result, a more

task-oriented structure at School B, and some children were made, by other members of their groups, to take on jobs they were not keen to do. Although the difference may have in part reflected a general difference in philosophy between the two schools, there was also a degree of difference in interpretation of the parameters of the study between the two pairs of teachers. In general, in both cases, groups would typically split into two pairs, organised around the two computers, with perhaps one pair working on a picture, and the other pair working on a page of text, although much of the discussion and work was done completely without the computer.

From the teacher interviews there was agreement that School A pupils on average produced better stories than School B. The reasons were seen to be partly a result of the socioeconomic backgrounds (which slightly favoured School A), but perhaps of more importance was the fact that School A teachers, with their more 'interventionist interpretation', had worked for a higher standard of result, and School B teachers had interpreted the parameters of the study as proscribing intervention and direction on their part.

From the interviews it became clear that the children were generally unaware of and/or unable to clearly articulate the process of job allocation, but more definite responses were obtained from the School A classes, reflecting again the difference in teaching style. (In School A, the A2 class children were instructed to divide jobs equally while in School B they were left to sort it out themselves). In many cases children in the same group contradicted each other when questioned on tasks and processes. It is hard to define just what the general method of division of labour was but probably in most cases it was 'automatic', with the leading children choosing what they preferred to do while the others did the rest. In some cases a 'horses for courses' rule prevailed with the best typist involved mainly with typing, etc.

Leadership and Decision-Making

The answers to questions regarding decision-making processes were often vague or contradictory. The impression created was that there were seldom any consistent rules applying. It was not clear whether voting, discussion or leader's decision was the more common practice. Very few children said it was the leader's decision but the general inability to answer this question with any conviction or certainty really leaves this whole area open.

There was a great reluctance to appoint an official leader combined with an almost equal reticence to admit to there being an unofficial leader. A

useful tactic to ascertain the true state of affairs within the group was for the interviewer to say:

> If I were a fly on the wall and was able to watch your group all the time I'm sure I could have picked who was really in charge!
> Who would I have picked?

For the Term 3 interview extra questions were added to further probe the leadership issue:

> Did you ever have to 'take charge' of what was going on?
> If yes - why and how, If no - did anybody else?, and
>
> Was there a group leader?
> If yes - how chosen - what did he/she have to do? -
> what would you have done if you were?

On the few occasions when the answer was 'yes' there was little said on the remainder of the question. The leadership question was valuable in that it told us that generally children did not like the idea of leaders and many chose not to have one, but in most cases an unofficial leader emerged who was recognised and accepted.

The 'fly on the wall' question was asked by some interviewers informally in the second interview, and was incorporated into the 'official' list of questions by the third (Term 4) interview. It clearly revealed that in most groups a leader did emerge. On the basis of this question, a clear leader could be identified in 17 of 30 groups in Term 4. In some other groups, there was disagreement as to who this person was, possibly reflecting a division between 'technical' leadership and 'story-line' leadership.

The responses of 'leaders' to certain questions were compared with the overall picture to see if there were any particular characteristics of leaders. (One leader was not present on the day of the interviews).

Table 3

Leadership characteristics: origin of story idea

Class	Leader had original idea	Leader with others	Other person had original idea	Total groups with 'leaders'
A2	2	1	0	3
A1	3	0	1	4
B2	5	1	1	7
B1	1	2	0	3
Total	11	4	2	17

The most notable result is shown in Table 3, relating who was credited with the original story idea. In cases where the children definitely agreed on the story's origin, the leader was the originator or one of the originators. In no case was there a solo story originator who did not become a leader or dominant person according to our definition via the 'fly on the wall' question.

In eight of these same 17 groups, the leader was the identifiable popular choice of other group members if they were to work with just one other member of their group. (In eight other groups there was no clear choice for a desired workmate). In only one case was the leader the most likely expellee from the group (Term 4 interview, question 8). Interestingly, group leaders appeared to have a much higher than average level of dissatisfaction with their own group. A minority (five) of identified group leaders answered that they would prefer to stay with their own groups, as opposed to moving to another group, working alone, or with one other partner (question 10).

It would seem that when a leader or a dominant person arises in a group they will often be the person who decides the topic and storyline. They will often be seen by the others as good people to work with but the feeling isn't reciprocated.

A question regrettably not asked in the Term 4 interview was who was the most expert at the computer. The relationship of computer-technical ability to group leadership or dominance is unknown. (Indications from the previous terms suggest that it quite often goes hand-in-hand but not as strongly as does the story idea).

Gender Issues

A summary of childrens' attitudes towards gender composition of groups, from the Term 2 interview, is set out below.

Boys liked mixed groups because they felt that this created a balance, and they liked the ideas the girls brought, helping to balance the story, although they saw girls' main skills as writing, typing and spelling. Girls liked mixed groups because they valued boys' ideas, and they too felt the need for 'balance'. Boys were seen as being good at 'computers' and drawing.

Boys saw themselves as slightly better performers at stories and pictures and were very wary of girls choice in stories and plot. Girls didn't see themselves as particularly good at anything except perhaps typing. They were

not so opposed to boys' stories as boys were to theirs, but they found boysargumentative, a comment which boys seldom used about girls. Interestingly, boys felt that an all-boys group could get carried away. Girls had equally negative feelings about all-girls groups, but were more likely to say that they wouldn't get things done.

Girls' comments on boys or mixed sex groups:

Positives:

Boys are good for ideas	9
Balance brought by boys' presence	6
Boys are good at computers	3
Boys are good at drawing	3
It's more fun with boys	2
Boys are good at things in general	1
Boys help you more	1
Boys make work easier	1
Boys are brainy	1

Negatives:

Boys are hard to work with because they argue	4
Don't like boys stories	2
Boys are always changing their minds	1
They make one feel embarrassed	1
Boys dominate	1

Self-positive:

Girls are good at typing	2
Girls like down to earth themes for story	1
Girls are good at writing	1

Self-negative:

Girls produce soppy stories	2
Girls talk too much	2
Girls fool around	2
Girls don't do much work	1
Girls get catty	1
Girls don't know much about computers	1

Boys' comments on girls or mixed sex groups:

Positive:

Girls' presence brings balance to story and/or group	6
Girls have different ideas to bring to story	4
Girls have good ideas	2
It is more fun with girls in group	3
Girls are easy to get on with	1
Girls are good at spelling and punctuation	1
Girls are good at writing	1
Girls are good at typing	1
Girls have more brains than boys	1

Negative:

Don't like girls' ideas on stories	5
Girls disagree too much	2
Girls don't work	1
They shoot ideas down	1
Don't like girls	1

Self-positive:

Better story	2
More agreement, faster, better	1
Boys are good at pictures	2

Self-negative:

Argue too much	3
Talk too much	2
Boys' stories are all about space	1
Boys' stories are too warlike	1

Opinion in favour of 'mixed' groups generally remained stable over the three terms. In Term 2 the groups were all teacher-chosen, while Term 3 was free choice. Table 4 summarises opinion about group composition at the end of Term 2. Despite the stated preference for mixed groups, the free-choice experiment produced only single-sex groups. The interviews revealed that very little attempt was made to bridge the gender gap. Most of the Term 4 groups were mixed, and in general pupil opinion was heavily in favour of mixed groups. Teacher opinion, from the teacher interview, was also highly in favour of mixed groups. According to one teacher, in self-chosen single-sex groups 'rowdy boys and twitty girls tended to flock together', and another teacher commented that single-sex groups tended to wander off task. All agreed that boys tended to be more dominant than girls when it came to using the computer, but there were some qualifications to this. Two teachers suggested that boys were not in fact as dominant as they would like to be, and

one teacher observed that although girls tended to stand back a bit at first, they would often work their way into a more commanding position over time.

Table 4

Attitude to future group composition

	Prefer mixed group	Prefer same sex	No preference	Total
Boys: From mixed group	30	9	6	45
From SS group	2	6	2	10
All boys	32	15	8	55
Girls: From mixed group	34	12	5	51
From SS group	5	1	1	7
All girls	39	13	6	58
All	71	28	14	113

One teacher felt that girls tended to see the computer as a boys' domain, and that there was therefore a need for affirmative action to ensure that girls 'got a fair go on it'. When the interviewer suggested that it was often the all-girl group that failed to get a story up and running, three teachers agreed. One teacher felt that a lot of the girls' energy was misdirected into 'manipulating the group rather than on-task', and conversely, another comment was that boys were more enthusiastic, but about playing games (rather than on-task).

It is hypothesized that although both pupils and teachers believed that mixed-sex groups work better, social embarrassment over choosing to work with members of the opposite sex militated against the formation of such groups with the Term 3 pupil-originated choice procedure. In general, the interview questions revealed that, from single-sex groups the majority would prefer to switch to mixed groups, but from the mixed groups only a few would rather change to single-sex.

However, there are definitely boys' and girls' subjects. Girls were less specific when answering the question about what subject they would like to write on, with the most common response (apart from 'Don't know') being 'Adventure'. Some girl-dominated groups had a tendency to pick topics around media characters such as 'Care Bears', 'Garfield' etc. which would alienate boys in the group, whereas in boy-dominated groups topics on war or space

would lead to girls becoming uninterested.

Despite this gulf there was a lot of common ground. Horror stories, Jungle and Adventure can apparently be enjoyed by both sexes!

Ability Factors

Analysis of the group interviews suggested that the most harmonious groups were mixed sex (i.e. more than one of each of boys and girls) and similar ability. This hypothesis was strongly affirmed by the teachers. (One teacher commented that 'groups that had social cohesion had ability in common'). Teachers also felt that the best way to form this sort of group was by pupils' choice, but mediated through the teacher; pure academic or psychometric measures of scholastic ability were not sufficient, as social characteristics had to be taken into account, and although children could generally identify in confidence who they could work well with, the class was apparently not capable of achieving this without teacher mediation. Apart from boys/girls often being too embarrassed to approach girls/boys to join their group, it seemed that there were also other factors, such as existing friendships and various social credits and debits, which would divert individuals from the initial goal of forming a good working group.

The evidence in favour of similar-ability over mixed-ability groups comes from an analysis of some of the Term 2 interview questions. Questions A2, A3, A5, B2, C3 and C4, D1 and D2 were chosen from the individual interview (see Appendix A) as indicators of the positivity of the group. The response of each child, as transcribed by the audio-analyst, was rated as positive, noncommittal, negative, missing or non-ratable. For each question, the individual scores were added over each class and divided by the appropriate N to give the strength of positive response indices shown in Table 5. The results generally favour the similar-ability groups.

Other Issues

There were a few other issues which emerged, largely from the Term 4 interview of teachers, the most common of these being related to the general feelings of the teachers about the use of computers in the classroom. Only one of the four teachers would have been willing to do without computers altogether, but on the other hand, only one found computers (and printers) no disruption at

all to their teaching. The potentially disruptive factors appeared to be printer noise, and the talking which resulted from children working in groups. Housing the computers in a separate room was generally not seen as a solution, although the back of the room, or a partially separated alcove was often the preferred site for the machinery.

Table 5

Strength of positive response to selected Term 2 questions

Class	Question A2	A3	A5	B2	C3&4	D1&2
A2	1.10	1.52	0.72	1.55	1.62	1.45
B2	0.68	1.39	0.65	1.00	0.87	0.58
total similar	1.78	2.90	1.37	2.55	2.49	2.03
A1	0.94	0.91	0.25	0.66	0.59	1.50
B1	0.56	1.32	0.76	0.96	1.00	1.52
total mixed	1.50	2.23	1.01	1.62	1.60	3.02

Note: the strength of positive response indices in this table are the class average rating of the responses to the question. 'Negative' responses were scored as '1', 'noncommittal' as '2' and 'positive' as '3'. Missing or non-ratable responses were excluded from consideration.

5 CONCLUSIONS

Observations from this study suggest that *Twist-A-Plot*, as an interactive fiction authoring system, was enjoyed and used productively by the children; and that collaborative writing using a computer is an entirely feasible exercise. However, there is a fundamental problem when these two concepts are put together - writing creative fiction is essentially a highly personal and individual task, and a group setting is less suited to this than to many other writing exercises. The greatest cause of disharmony was over thematic preference, resulting especially from the differing interests of girls and boys. The fictional interests of the genders seldom coincide, and problems often arose right at the start of the exercise because of this.

More teacher guidance in the choice of story subject matter may help the group to run smoothly, or at least get started and on-task earlier. As this is the main focus of discord two suggestions arise. The first is to allocate children to groups taking subject preferences into account, the other is for the teacher to outline possible themes for the groups to take up and develop. It should however be noted that single-sex groups also had problems over storyline and topic, and disputes were not confined to mixed groups.

Another major disadvantage of group learning is the possibility of individuals being excluded from a large part of the work. Because the chance of each child having solo use of the computer on this task or at other times could be limited or nil, it is important that checks are made on the competence and confidence of all the individuals in the group. A good end product by a group may reflect the ability of only one or two of its members.

According to Slavin (1987) 'Two elements are required to make cooperative learning more effective than traditional instruction: *group rewards* and *individual accountability.*' It is suggested, therefore, that teachers maintain close involvement with pupils ensuring that they each have turns at the different tasks. A 'Horses for Courses' situation where the good typist does all the typing and the artistic person all the graphics may produce a good end product, but may not be beneficial to the individuals in the group.

Gender of groups is an interesting issue too, and also a matter where teacher-intervention can make things go more smoothly. Despite differing thematic interests, pupils appear to have a definite preference for mixed-sex

groups, and have clear ideas as to why they think a balence is better. However, they have some difficulty in implementing these ideals without some 'outside help'.

The teachers also prefered mixed- to single-sex groups. While they noted that some single-sex groups could work extremely well, the bad groups tended to be single-sex. It was considered that by mixing effectively a more balanced working atmosphere resulted.

The most successful system for forming groups was to require each child to submit to the teacher the name of the boy and girl with whom they were prepared to work. The teacher then tried to construct groups which took into account these preferences, but retained the final say in order to avoid groupings which would be detrimental to order in the classroom.

For this sort of task, the ideal group is four, certainly no larger, though groups of three often worked quite well. The impressions and results of this study favour similar-ability groups over mixed-ability: presumably there is more chance of equal participation and less of exclusion in groups of more or less equally-matched peers. Analysis of certain questions from the Term 2 interview support this position too, although it should be noted that this focussed on pupils' feelings about participation in the group, rather than any academic or performance measure. Caution should be exercised in extending this conclusion to ability streaming in general, although the findings support similar-ability grouping within a wider context.

Some comments are also in order on the interview process developed here, as a substitute for the more expensive in-situ observation. Unfortunately, there was not time to perfect this instrument before the study was under way. However, by the third time around, the researchers were confident that the interview process was providing a true and reliable picture of the group processes. Teachers too were surprised and pleased with how much they learned about their own children, which may not have been evident from their own classroom observations.

Over the progress of the study, the interview question sheet was ammended to make the questions more direct and less difficult for the child to understand. It achieved this purpose and the result was liked by the interviewers as, in combination with the informal group interview, it took less time. The final (Term 4) version contained 19 questions and an answer checklist for the teacher.

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Appendix A

The student interview schedules,
used at the end of Term 2, Term 3 and Term 4

GROUP INTERVIEW: Term 2

TIME: 20 minutes

(A) 1. Tell me how the story goes - leading into:
2. Did you decide at the very beginning on how the storywould go or did you make new decisions each time you worked on it ?

(B) 1. How did you decide on who did what - who did the typing, and who did the pictures, and who thought up the story ?
2. Did ... do that all the time, or did someone else take a turn ?
3. Who decided he/she was going to be allowed to anyway ?
4. Did your group have a leader - who chose ?
5. Were you happy with the way the leader was chosen and how it worked ?
6. If no leader was chosen how were decisions reached ?

(C) 1. Did you have any major disasters or problems ?
2. How did you solve that problem (or those problems) ?

(D) 1. Did it seem to take a long time to get it right ?
2. Too long ?
3. Did you spend extra time on it, after school or anything ?
4. Do any of you work together on any other things ?

INDIVIDUAL INTERVIEW: Term 2

TIME: 10 minutes

(A)
1. Seems like you did ... ..., is that right ?
2. What did the others think of your work ?
3. Were you happy with what you had to do in the group ?
4. Did you have a chance to change what you were doing ?
5. Did the others think you were especially good at ... ?

(B)
1. Did you spend much time thinking about the story on your own ?
2. Did you enjoy working with the others on the story or would you rather have done it by yourself/others ?
3. Was there anybody else in your group who preferred to work alone ?
4. Would you rather have worked with just boys/girls (mixed sex groups) ? Why ?
   Would you have liked the chance to work with just boys/girls (single sex groups) ? Why ?

(C)
1. Was there anybody who knew more about how to use the computer, or how to go about writing the story than the rest of you ?
2. Or was there anybody who thought they knew more ?
3. Was anyone in your group allowed to suggest, change or add to your text or picture ?
4. Did you mind ?
5. Did you think it improved it ?

(D)
1. Do you think it's a pretty good story ?
2. If you were going to work on another one with the same people what would you want to do differently ?

GROUP INTERVIEW: Term 3

TIME: 20 minutes

(A) 1. Tell me how the story goes - leading into:
2. Did you decide at the very beginning on how the story would go or did you make new decisions each time you worked on it ?

(B) 1. How many in the group ?
2. Who/how decided who was in the group ... why single-sex groups - especially after what was said in last term's interviews. Did this change (i.e. loners etc...).
3. How did you decide on who did what - who did the typing, and who did the pictures, and who thought up the story ? and
4. Did ... do that all the time, or did someone else take a turn ?
5. Was anybody given any definite jobs to do ? e.g. leader, recorder, illustrator, etc.
- did those roles change/swap around ?
- what was involved in doing them ?
6. Who decided he/she was going to be allowed to anyway ?
7. Did your group have a leader - who chose ?
8. Were you happy with the way the leader was chosen and how it worked ?
9. If no leader was chosen how were decisions reached ?

(C) 1. Did you have any major disasters or problems ?
- distinguish between technical, work flow, and group dynamic problems.
2. How did you solve that problem (or those problems) ?

(D) 1. Did it seem to take a long time to get it right ?
2. Too long ?
3. Did you spend extra time on it, after school or anything ?
4. Do any of you work together on any other things ?
5. Were there any sub-groups operating within the group (if n > 2).

INDIVIDUAL INTERVIEW: Term 3

TIME: 10 minutes

(A) Remember to concentrate more on process than product.
Not so long on questions 1-5.

1. Seems like you did ... ..., is that right ?
2. What did the others think of your work ?
3. Were you happy with what you had to do in the group ?
4. Did you have a chance to change what you were doing ?
5. Did the others think you were especially good at ... ?
6. What could you have done to make the group work (even) better ?
7. Did you ever have to 'take charge' of what was going on ?
   If yes - why and how ? If no - did anybody else ?
8. Was there a group leader ?
   If yes - how chosen ? - what did he/she have to do ?
   - what would you have done if you were ?
9. Did you ever have to do things you didn't really want to because of the others ?

(B)
1. Did you spend much time thinking about the story on your own ?
2. Did you enjoy working with the others on the story or would you rather have done it by yourself/others ?
3. Was there anybody else in your group who preferred to work alone ?
4. Would you rather have worked with just boys/girls (mixed sex groups) ? Why ?
   Would you have liked the chance to work with just boys/girls (single sex groups) ? Why ?
   Probe on discrepancy between <u>ideal</u> and <u>actual</u>, especially in relation to sex of the group.

(C)
1. Was there anybody who knew more about how to use the computer, or how to go about writing the story than the rest of you ?
2. Or was there anybody who thought they knew more ?
3. Was anyone in your group allowed to suggest, change or add to your text or picture ?
4. Did you mind ?
5. Did you think it improved it ?

Not too much time on this section.

(D)
1. Do you think it's a pretty good story ?
2. If you were going to work on another one with the same people what would you want to do differently ?
3. How did this term's group compare with last term's ?
4. How did this term's story compare with last term's ?

INDIVIDUAL INTERVIEW: Term 4
TIME: 10 minutes
NAME _____ GROUP _____
First establish if the child is new to the project or has been involved before:
New to the project [ ] has been involved before [ ]

1.	Who had the story idea ?	_____/ vague
2.	What did you think you did in the group ?	typing writing graphics editing other all
3.	How was it decided who did what jobs ?	divided equally specific tasks divided unequally
4.	Did the group have a leader ? (If no go to fly on the wall).	leader unofficial leader no leader
5.	How were decisions made ?	voting leader decided discussion tossed coin etc. vague
6.	Did you ever have to 'take charge' of the group at any time ? If 'yes', why, how ?	yes no
7a.	How well did you think the group worked together ?	poor okay good usually sometimes split
7b.	What could you have done to make the group work better/even better ?	something nothing
8.	If the group had to be reduced by one who would be left out ?	name _____ vague nobody
9.	If you had to work with just one other from this group, who would you choose ? Why ?	name _____
10.	Did you like being in this group ? Would you prefer to be in another ? Would you prefer to be by yourself ?	liked this group pick another group work alone vague

11a.	Which do you think is best - mixed or single-sex groups ?	mixed single-sex either no opinion
11b.	If mixed groups were in your classroom how would you like it done ? a) Teacher organises groups b) Teacher influenced by child c) Child	_____
12.	What did the others think of your work ?	liked it thinks they liked it didn't like it don't know
13.	Do you think it is a good story ? Rate 1 - 10.	_____
14.	Did the stories take a long time to get right ?	yes no unsure
15.	Did the teacher have to help you at any stage ? (Eliminate technical task help).	yes no unsure
16.	Did you spend much time thinking about your stories away from school ?	yes no unsure
17.	If you were doing another story, what would you like it to be about ?	_____ _____ _____

Appendix B

Rationale and analysis of the
Term 2 and Term 3 interviews

Development and analysis of the interview schedules

The original (Term 2) interview comprised 14 questions though the interviewers were free to add any they chose to. The questions were divided into four sections:

A1: *Tell me how the story goes - leading into:*
being simply a lead in question to get the children talking.

A2: *Did you decide at the very beginning on how the story would go or did you make new decisions each time you worked on it?*
This question brought a mixture of responses from among the same group but generally there was a plan which was amended on the way. The question was designed to see the degree of planning or lack of planning used by the children. It revealed that they did know how to plan a flow chart.

B1: *How did you decide on who did what - who did the typing, and who did the pictures, and who thought up the story?*
This question was designed to determine whether there was a task allocation process. This question revealed the big difference between the schools. School A children were instructed to divide the tasks up evenly, for example, if a group of four planned a story of 20 pages each would be responsible for five pages and one picture. The School B pupils were more inclined to keep on specific jobs; somebody who showed talent at graphics or typing mainly doing this sort of work. One negative aspect of this is that dominant children in the group were able to monopolize the tasks they preferred while the subordinate could be kept at tasks they may not have wanted.

B2: *Did ... do that all the time, or did someone else take a turn.*
This was tied in with the previous question and was irrelevant for School A anyway.

B3: *Who decided he/she was going to be allowed to anyway?*
This was supposed to reveal if there was somebody allocating the tasks but, due to the nature of the previous question and answer, was seldom asked and was of no value.

B4: *Did your group have a leader - who chose?*
This revealed that most groups did not have or want an official leader. Where there was one, the method of 'choosing' was not really understood.

B5: *Were you happy with the way the leader was chosen and how it worked?*
This turned out not to be applicable in most cases.

B6: *If no leader was chosen how were decisions reached?* Confusion is probably the best way to describe the response to this question. Discussion, voting or tossing coins were the main answers but different members of the group would give differing answers indicating that children were largely unaware of the social process of their groups and had difficulty in articulating an answer.

C1: *Did you have any major disasters/problems?* and
C2. *How did you solve that problem (or those problems)?*
These questions were conversation pieces put in to stimulate ideas and memories but the answer to the first did reveal that the children thought in technical rather than interpersonal terms when answering.

D1: *Did it seem to take a long time to get it right?*
D2: *Too long?*
These were to determine if there had been any real difficulties, and apart from indicating that in Term 3 the pupils had less difficulty than when they first tried *Twist-a-plot*, the information gleaned was useful for constructing a picture of the group's competence.

D3: *Did you spend any extra time on it, after school or anything?*
By asking about extra time spent the researchers were keen to discover whether they got bogged down or were they absorbed with interest. However the answers were generally inconclusive and no result from this question emerged.

D4: *Do any of you work together on any other things?*
This was put in to help analyse sub-group relationships, but the answers were so varied that nothing could be concluded.

In Term 3's group interview four questions were added:
B1: *How many in the group?* was superfluous.
B2: *Who/how decided who was in the group ... why single-sex groups - especially after what was said in last term's interviews. Did this change (i.e. loners or ...).*
A many-sided question designed to understand the group selection process. Little was learnt except that there was no real attempt to bridge the gender gap when children were allowed free choice of groups.

B3: *How did you decide on who did what - who did the typing, and who did the pictures, and who thought up the story?* added little but
B5: *Were there any sub-groups operating within the group (if n > 2).*
was useful in grasping the political structure of the group.

The Term 4 group questionnaire was designed primarily as a warm-up to stimulate discussion and familiarize the interviewer and researcher with the group.

In summary, the group interviews were not particularly useful to the audio analyst, although the interviewers said they could pick up a lot from the body language and acting of the children, which of course did not come out on tape. The audio analyst found it difficult to distinguish voices, and if two or more children were speaking at once it was incomprehensible.

Individual Questions

Individual questioning revealed much about the dynamics of the group and generally enabled a picture of the political structure to emerge. Children were obviously less inhibited without the rest of the group present.

The individual interview was designed to last about 10 minutes. In Term 2 it consisted of 16 questions the first of which
A1. *Seems like you did ....., is that right?*
was a conversation piece.

A2. *What did the others think of your work?*
was an endeavour to find out the child's perception of how he/she was viewed by the others in their group. In most cases there turned out to be no serious problems but it was also discovered that children did not know how the others felt about their work. Supportive comments are apparently not a normal part of child interaction.

A3. *Were you happy with what you had to do in the group?*
was intended to reveal whether the child had been forced into drudgery tasks which they didn't want, while others worked on the jobs of their choice. While question 3 told us a little, question 4 was misinterpreted by the interviewers. The most important difference that emerged here was the difference between the schools, alluded to earlier.

Section B sought to determine the degree of importance the child attached to the project or if they had worried about the project away from school. The latter seems never to have been the case, but it was noticeable that those who answered in the affirmative often came across as being of a particularly imaginative disposition. As the majority response was negative it can be concluded that the project was not seen as anything out of the ordinary run of school work.

B2. *Did you enjoy working with the others on the story or would you rather have done it by yourself/others?* and
B3. *Was there anybody else in your group who preferred to work alone?*
These were set to discover relationships within the group. There were two aspects to question 2, to indicate the individual satisfaction with the group and if that child was a loner. From question 3 it was hoped to learn more about loners or any children who were 'the odd one out' in any way, but in this respect it was not very successful.

A summary of the response to B4 (gender preferences) is set out in the Results section. The same question in Term 4 brought out a majority in favour of Mixed. In Term 2 the groups were all teacher-chosen, while Term 3 was free choice. Despite the stated preference for mixed groups the free-choice experiment produced only single-sex groups, with the interviews revealing that very little attempt was made to bridge the gender gap. Most of Term 4 groups were mixed and the result was heavily in favour of mixed groups.

C1. *Was there anybody who knew more about how to use the computer, or how to go about writing the story than the rest of you.*
As was intended, this revealed who was the most competent at the computer or if all were about equal.
C2. *Or was there anybody who thought they knew more?*
told us who the (competent ?) know-all was, but there do not seem to have been many of them.

C3. *Was anyone in your group allowed to suggest, change or add to your text or picture?* showed that cooperative principles are generally understood and held by the children. However, their practice often falls short of their ideal. Different answers to this and other questions from within the same group were common, indicating rules were not well defined or understood.

The responses to C4. *Did you mind?* and
C5. *Did you think it improved it?* revealed that only in a few cases did a child admit to resenting interference. More common was the appreciation of the value of others' suggestions. Though these two answers were probably the ideal rather than the reality the impression remains of largely successful cooperation in the groups.

D1. *Do you think it's a pretty good story?*
This was supposed to register the degree of product satisfaction, but, as worded, only told us whether the story was exceedingly good or bad.

D2. *If you were going to work on another one with the same people what would you want to do differently?*
This was asked in order to ascertain whether the child thought in terms of storyline or group performance. It transpired the pupils were mainly concerned with story line and the latter was not a great consideration.

For Term 3 extra questions were added:
A7. *Did you ever have to 'take charge' of what was going on? If yes - why and how, If no - did anybody else?* and
A8. *Was there a group leader? If yes - how chosen - what did he/she have to do? - what would you have done if you were?*
again asking if there was a leader. On the few occasions when the answer was 'yes' there was little said on the remainder of the question. The leadership question was valuable in that it told us that generally children did not like the idea of leaders and many chose not to have one, but in most cases an unofficial leader emerged who was recognised and accepted.

A9. *Did you ever have to do things you didn't really want to do because of the others?*
Although intended to help determine the level of the group's cohesion this revealed nothing of value. A few children verbalized that collaborative activity meant occasionally they had to perform tasks they didn't want to.

D3. *Do you think it's a pretty good story?* and
D4. *How did this term's story compare with last term's?*
These were key questions focussing on group construction and selection. Generally most thought Term 3 was better on both counts. Although this was attributed to single-sex groups by some of the pupils, others regarded it as a result of being more experienced.

Unlike the second interview schedule the third (Term 4) was drawn up after anlysis of the previous results and responses. The question sheet was ammended to make the questions more direct and less difficult for the child to understand.

This goal was achieved, and the result met with the interviewers' approval as in combination with the informal group interview it took less time. It contained 19 questions and an answer checklist for the interviewer. Most of the pupils at School B were new to the project while a large number at School A were involved for the third time. Because of that, the School B children were given a set story to complete in their groups before embarking on one of their own choice, and some of the answers recorded were responses to the situation in their first story.

Appendix C

Summary of responses to the Term 4 interview

1. Who had the story idea?

Class	Group Summary Joint effort	Definite Person	Two People	Ambiguous
A2	0	4	1	2
A1	2	4	1	0
B2	1	3	1	3
B1	2	1	0	5
Total	5	12	3	10

2. What did you think you did in the group?

This was a valuable question but its answers are not able to be tabulated. If asked properly it could tell the degree of participation of the child in question. However when itemised the children appeared to say 'yes' to most things. For a subsequent questionnaire it would be useful to enlarge this question and ask what the others in the group did. Thus a comprehensive picture of the distribution of the workload could be established.

3. How was it decided who did what jobs?

Class	Group Summary All did own pages	Ambiguous	Unknown
A2	5	2	0
A1	2	4	1
B2	1	7	0
B1	2	6	0
Total	10	19	1

In a lot of cases children in the same group contradicted each other. It was hard to define just what the general method of division of labour was but probably in most cases it was 'automatic', with the leading children choosing what they preferred to do while the others did the rest. In some cases a 'horses for courses' rule prevailed with the best typist involved mainly with typing etc.

4. Did the group have a leader? (If 'no', go to 'fly on the wall' strategy!)

Class	Group Summary Definite leader(s)	No leader	Ambiguous
A2	3	3	1
A1	4	2	1
B2	8	0	0
B1	3	3	2
Total	18	8	4

6. Did you ever have to 'take charge' of the group at any time? If 'yes', why, how?

This question enabled the interviewer to build up a picture of the internal power structure. If a child admitted to having taken charge it was usually because the others were 'mucking about' or wouldn't work.

7a. How well do you think the group worked together?

Group Summary

Class	Group worked OK/good	Group worked badly	Ambiguous
A2	5	0	2
A1	6	0	1
B2	4	0	4
B1	4	0	4
Total	19	0	11

The worth of this question was doubtful. Noticeably no group was unanimous in admitting it worked badly, yet comment and answers elsewhere indicated otherwise. The words used to answer e.g. 'pretty good' 'quite good' can sound from enthusiastic to grudging. A few terms covered a wide range of options. Tone rather than words reflected a more accurate assessment. There was a definite reluctance by pupils to answer this question in a negative manner. A better question for finding out how the child really felt about the group was question 10.

7b. What could you have done to make the group work better/even better?

Individual Summary

Class	No definite response		Comments forthcoming		Not asked
A2	18	(8,10)	7	(3, 4)	
A1	15	(5,10)	5	(3, 2)	7
A total	33	(13,20)	12	(6, 6)	
B2	15	(3,12)	12	(9, 3)	5
B1	14	(9, 5)	13	(6, 7)	2
B total	29	(12,17)	25	(15,10)	7
Study total	62	(25,37)	37	(21, 1)	14

Note: figures in brackets are (boys,girls)

This was a clever question put in a commendably positive way. Unfortunately the children didn't really respond very well to it. Had the question been phrased more directly it may have revealed more about the main problems of the groups as was intended.

To try and categorize the 'No Definite Response' answers is difficult; they mainly consisted of 'I don't know' and 'nothing'. The latter is especially ambivalent, because 'nothing' meant 'I can't think of anything' as well as 'nothing to be done as this group worked well' and also 'nothing could be done as this group was beyond hope.'

Of the pupils who offered comments it was the boys who were more inclined to suggest something while the girls were more reticent. Approximately half of the suggestions referred to the inability or bad behaviour of others and two called for teacher intervention to rectify this. The two other main areas of comment concerned organisation changes and calls for better effort by the group participants.

8. If the group had to be reduced by one who would be left out?

Group Summary

Class	Definite expellee	No expellee	Ambiguous
A2	5	0	2
A1	4	1	2
B2	0	1	7
B1	6	1	1
Total	15	3	12

The expellee could achieve this status for three reasons
1) He/she was 'new' and didn't know very much about computers
2) He/she was socially unsuited to the group and caused arguments
3) He/she played around instead of working.

Sometimes the group could still function reasonably well despite the presence of an 'enfant terrible'.

9. If you had to work with just one other from this group, who would you choose? Why?

The general rule for mixed groups was boys choose boys and girls choose girls. On the occasions when this didn't happen (with typically two boys and two girls) it was a clear sign that there had been a problem child in the group. When asked the reason for their choice pupils would generally give one of the following:
1) Preference for same sex (in just a two-person situation)
2) Preference for a friend
3) Preference for a good worker.

10. Did you like being in this group? Would you prefer to be in another? Would you prefer to be by yourself?

Group Summary

Class	Prefer existing group	Prefer Another	Ambiguous
A2	3	3	1
A1	2	1	4
B2	4	3	1
B1	5	0	3
Total	14	7	9

This group result should be compared to question 7a. This (question 10) is a much more accurate measure of dissatisfaction. In seven groups there was a clear preference amongst most or all members for another group. In another nine the view was split indicating less discord.

11a. Which do you think is best - mixed or single sex groups?

Individual Summary

	From Mixed		From Single Sex		
	Mixed	Single Sex	Mixed	Single Sex	Ambivalent
Class					
A2	21 (8,13)	3 (1,2)			1
A1	21 (8,13)	1 (1,0)	3 (3,0)	1 (1,0)	1
A total	42 (16,26)	4 (2,2)	3 (3,0)	1 (1,0)	2
B2	10 (4, 6)	3 (3,0)	11 (6,5)	7 (3,4)	1
B1	8 (5, 3)	1 (0,1)	11 (7,4)	7 (4,3)	2
B total	18 (9, 9)	4 (3,1)	22 (13,9)	14 (7,7)	2
Study total	60 (25,35)	8 (5,3)	25 (16,9)	15 (8,7)	2

Note: figures in brackets are (boys,girls)

The predominant preference was for mixed groups; it was felt that they worked better. This was more marked than in the previous terms but according to the teachers these groups had been more harmonious than the others.

From single-sex groups the majority would have preferred to switch to mixed groups, but from the mixed only a few would rather have changed to single-sex.

11b. If mixed groups were in your classroom how would you like it done?

(a) Teacher organises groups
* (b) Teacher influenced by child
(c) Child

Individual Summary

Class			(a)		(b)		(c)	Ambivalent
A2	*	8	(3, 5)	12	(5, 7)	5	(2, 3)	
A1		7	(4, 3)	9	(6, 3)	5	(1, 4)	6
B2		5	(1, 4)	15	(9, 6)	11	(6, 5)	1
B1	*	8	(5, 3)	13	(6, 7)	8	(5, 3)	
Total		28	(13,15)	49	(26,23)	29	(14,15)	7

Notes: figures in brackets are (boys,girls)
* chosen by system b this term.

A clear preference was shown for the joint teacher and child approach in which the child submits the names of who he/she would prefer and prefer not to work with to the teacher who selects the groups using the information as a guide.

This was not an easy question to ask for the interviewers and in their emphasis they differed markedly. The interesting result was that the two classes (A2 and B1) which had been selected by this method showed no apparent difference from the others in responses.

12. What did the others think of your work?

The usual answer was 'Don't know'. The interviewers were seldom satisfied with this and frequently prompted the pupil until an answer was forthcoming. The impression gained by the audio analyst was that when an answer was squeezed out it was for the interviewer's benefit and not a good recollection of the experience. The only real conclusion that can be made is that children rarely gave each other encouragement or compliments and seldom admitted to criticism.

13. Do you think it is a good story? Rate 1 - 10.

The usual answer was from 7-9. This question was useful in that if all members rated their story very highly or very poorly it was an indication of extremely bad or extremely good work.

14. Did the stories take a long time to get right?

Group summary

Class	No	Yes	Ambivalent
A2	2	3	2
A1	1	3	3
A Total	3	6	5
B2		3	5
B1	2	2	4
B Total	2	5	9
Study Total	5	11	15

Only a sixth of the groups clearly felt no time problems. But the high total of the groups with mixed responses is an indication of the differing points of view within the group and this is a pointer to lack of group cohesion and coordination.

15. Did the teacher have to help you at any stage? (Eliminate tech task help).

Group Summary

Class	Definite No	Definite Yes	Ambivalent
A2	7	0	0
A1	3	2	2
A Total	10	2	2
B2	2	4	2
B1	2	2	4
B Total	4	6	6
Study total	14	8	8

The idea behind this question was to assess the amount of teacher intervention. The result with its difference between the schools is as expected. The School A children were more computer-experienced and therefore their group interactions should have been (and were) smoother.

16. Did you spend much time thinking about your stories away from school?

Individual summary

Class	Yes	No	Ambivalent
A2	11 (3, 8)	13 (8, 5)	1 (1,0)
A1	3 (1, 2)	20 (9,11)	4 (4,0)
A total	14 (4,10)	33 (17,16)	5 (5,0)
B2	11 (6, 5)	18 (9, 9)	2 (1,1)
B1	14 (8, 6)	12 (7, 5)	3 (1,2)
B total	25 (14,11)	30 (16,14)	5 (2,3)
Total	39 (18,21)	63 (33,30)	10 (7,3)

Note: figures in brackets are (boys,girls).

Only one pupil admitted to being worried about the project. It seemed to the audio analyst that it was generally the more imaginative children who thought about it after hours.